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UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
WEST, JEFFREY R

ART UNIT	PAPER NUMBER
2857	

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Please find below and/or attached an Office communication concerning this application or proceeding.

	Application No.	Applicant(s)
	09/910,371	SEEM, JOHN E.
Offic Action Summary	Examiner	Art Unit
	Jeffrey R. West	2857

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Peri d f r Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM
THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed
  after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any
  earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *11 July 2003* .

2a) ☒ This action is **FINAL**.   2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is
closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1,3 and 5-19* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1,3 and 5-19* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *20 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11) ☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

    If approved, corrected drawings are required in reply to this Office action.

12) ☐ The oath or declaration is objected to by the Examiner.

Pri rity under 35 U.S.C. §§ 119 and 120

13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a)☐ All b)☐ Some * c)☐ None of:

      1.☐ Certified copies of the priority documents have been received.

      2.☐ Certified copies of the priority documents have been received in Application No. _____ .

      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage
application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

    a) ☐ The translation of the foreign language provisional application has been received.

15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)	4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)	5) ☐ Notice of Informal Patent Application (PTO-152)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .	6) ☐ Other:

DETAILED ACTION

Claim R j ctions - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 1, 3, and 5-8 are rejected under 35 U.S.C. 103(a) as being unpatentable

over U.S. Patent No. 4,990,893 to Kiluk in view of Carey et al., "Resistance and

Test-Based Outlier Rejection: Effects on Gaussian One- and Two-Sample

Inference."

Kiluk discloses a method in an alarm system, including recording of energy

consumption, such as electricity, gas or water utility consumption (column 3, lines 4-

10), by repeatedly measuring a level of use of a utility to produce a plurality of utility

measurements (column 2, lines 48-51 and Figure 2). Kiluk then discloses

comparing a current measurement to a corresponding reference value at the same

point in time. It is then determined whether the current measurement varies

significantly (i.e. is an outlier) compared to the value and, if so determined, the

severity of an abnormality in utility consumption is identified (i.e. evaluation of

system performance) (column 2, line 57 to column 3, line 3). Although, Kiluk doesn't

specifically disclose performing separate comparisons, Kiluk does provide the

functionally equivalent method for comparing the measurement values to the

reference values with groups defined by time periods of normally similar usage

(column 3, lines 24-27), groups of days of normally similar usage, and groups dependent on changes in living habits (column 3, lines 46-61).

Although Kiluk teaches comparing the current measurements to reference values in order to determine significantly outlying data values, Kiluk doesn't provide a corresponding statistical method for determining what values are significantly outlying, specifically by using a GESD.

Carey teaches a method for outlier detection through the use of the Generalized Extreme Studentized Deviate (GESD) statistical procedure (page 326, column 2). Carey also teaches the definition of the GESD procedure comprising determining how many standard deviations a given outlier is from an average of the samples using the equation $R1 = \max |X_i - X| / s$ where X_i is the amplitude of the i-th outlier, X is the average (i.e. mean) value of a plurality of samples, and s is the standard deviation. Carey also teaches determining the critical values using a common student t-distribution equation and determining the percentile using the equation $p = 1 - [(\alpha / 2) / (n - l)]$ (page 329). Carey also teaches determining an outlier, removing each outlier, and repeating the determining and removing steps until all outliers have been identified and removed (i.e. iterative peeling) (page 321, column 1).

Although not specifically disclosed, in order to used the equations previously described, it is considered inherent that the value X_i, corresponding to the current outlier, the value of X (i.e. mean), and the value of s (i.e. standard deviation) must all be previously determined since the equations require these initial values.

It would have been obvious to one having ordinary skill in the art to modify the invention of Kiluk to include determining what values are significantly outlying using a GESD, as taught by Carey, because the combination would have provided a method necessary in the invetion of Kiluk to discriminate between small changes in measurements and significant deviations which, as suggested by Carey, is a well known, accurate, method that explicitly follows error-based standardization and can be calibrated to possess any desired mislabeling rate (page 321, column 2).

3. Claims 9-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiluk in view of Carey et al. and further in view of Sematech, "The Engineers Statistical Internet (ESI) Handbook: Grubbs' Test for Outliers."

As noted above, the invention of Kiluk and Carey teaches all the features of the claimed invention except for specifying what percent of a critical value indicates the occurrence of an outlier.

Sematech teaches the well-known definition of the Grubbs' statistic (also known as the GESD) for determining the largest absolute deviation from a sample mean in units of the sample standard deviation. Sematech also teaches determining an outlier if it exists outside the critical regions wherein the critical regions are defined as having limits calculated as either 100α or 95α percent of the critical values.

It would have been obvious to one having ordinary skill in the art to modify the invention of Kiluk and Carey to include specifying that the confidence level be at 100% of the critical value, as taught by Sematech, because the combination would

have provided a necessary value to indicate an outlier occurrence that would result

in a high level of confidence. Further, although the Applicant describes the use of a

100% value in the specification, Applicant fails to provide the criticality for choosing

this value. Therefore this feature is considered an engineering design choice and it

would have been obvious to one having ordinary skill in the art to choose whatever

confidence level desired in a specific implementation.

4. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kiluk in

view of Carey et al. and Sematech and further in view of U.S. Patent No. 5,555,195

to Jensen et al.

As noted above, the invention of Kiluk and Carey teaches all the features of the

claimed invention except for specifying that maintenance be performed on the

system in response to the examination of one or more of the outliers.

Jensen teaches a controller for use in an environment control network capable of

storing diagnostic information comprising a processor for receiving a sensed

parameter value, providing a summary value related to the parameter value, and

storing the summary value in memory (column 2, lines 54-67). Jensen also teaches

sending summary data indicative of the lifetime operation of the device being

monitored to an operator for review (column 3, lines 16-23) wherein the operator

views outliers in the data as devices requiring maintenance (column 9, lines 57-65).

It would have been obvious to one having ordinary skill in the art to modify the

invention of Kiluk, Carey, and Sematech to include specifying that maintenance be

performed on the system in response to the examination of one or more of the

outlier, as taught by Jensen, because the invention of Kiluk, Carey, and Sematech

teaches alarming the user to an abnormality when an outlier value is detected and,

as suggested by Jensen, the combination would have provided a method for

correcting the occurrence of errors and therefore restored proper operation (column

9, lines 57-65).

Response to Arguments

5. Applicant's arguments filed 11 July 2003 have been fully considered but they are

not persuasive.

Applicant argues that the invention of Kiluk filters out extreme values before

performing the usage comparison and "persons skilled in the art would recognize

these "extreme vales" as the outliers, rather than the measured values that exceed

th[e] alarm thresholds. Thus, Kiluk fails to disclose or suggest "evaluating

performance of the system in response to any outliers identified" as required by

claim 1.

The Examiner asserts that Applicant specifically defines outliers as "data

samples that vary significantly from the majority of the data" (page 6, lines 15-16).

This definition is in accordance with the values used in the comparison of Kiluk,

which differ from standard values by a predetermined amount. Further, the values

filtered from the data in the invention of Kiluk are "values which occur only

occasionally" and therefore, they would also not be considered outliers based upon

the instant specification that indicates outliers could be up to 50% of the data

samples (page 9, lines 9-13). Therefore, due to the definitions provided in the

instant specification and due to the fact that, during patent examination, the

Examiner is to "give claims their broadest reasonable interpretation in light of the

supporting disclosure" (See In re Morris, 127 F.3d 1048, 1054-55, 44 USPQ2d 1023,

1027-28 (Fed. Cir. 1997)), the values used in the comparison of Kiluk are correctly

interpreted as outliers.

Applicant then argues that "Carey fails to make up for any of the above-

deficiencies noted in Kiluk. Carey simply provides a generalized discussion of the

well-known GESD method for detecting outliers. There is simply no disclosure or

suggestion in Carey to do anything with the outliers once they are detected."

The Examiner asserts that, as noted above, the invention of Kiluk teaches

determining and using outliers consistent with the definition provided by Applicant, to

determine utility usage and Carey is only used to include a specific method for

determining the outliers.

Applicant then argues that the invention of claim 3 differs from the combination of

Kiluk in view of Carey in that "even if the values that exceed the alarm/warning

thresholds in Kiluk can be properly considered "outliers" (which the Office Action

apparently contends and Applicant disputes), Kiluk would still fail to disclose or

suggest the invention of claim 3 for at least the reasons that the standard curve to

which the measured values are compared is based on all the data rather than just

the non-outlier data as would be required by claim 3." Applicant then argues that

"[a]s for Carey, although it discloses the calculation of an average for the data and a

standard deviation, both values are similarly based on all the data (i.e., including the

outliers) rather than just the non-outlier data as required by claim 3."

The Examiner contends that the invention of claim 3 does require calculation of

the standard deviations a given outlier lies from the average utility usage by

subtracting the "robust estimate of the average energy consumption" from the

detected outlier value, and then dividing the this difference by the "robust estimate of

the standard deviation of energy consumption" and also agrees with Applicant's

definition that the "robust estimates" are "determined using non-outlier data (i.e. the

set of data which remains after all of the outliers have been detected and removed)."

The Examiner does maintain, however that the invention of Carey teaches this

method by determining the most extreme deviate, removing the most extreme

deviate, and recalculating to determine a new most extreme deviate using the

smaller set of samples. Carey then teaches repeating this process until all of the

extreme deviates are removed, each time using mean and standard deviation

estimates based on sample sets with the extreme deviates removes (i.e. robust

mean and standard deviation values) (Carey et al., page 329, Appendix A).

Applicant then argues that "[c]laim 3 is further patentable over Kiluk in view of

Carey because it requires that the z-score calculation be performed for each outlier

using only data "for days of the same day type" as the outlier" and "[t]here can be no

dispute that Kiluk discloses the use of only a single "standard curve 12" (rather than

a plurality of curves) for the alarm/warning threshold determination. There is simply

no disclosure in Kiluk, let alone recognition of the problem, that a facility may have

different consumption patterns for different days of the week. Hence, there can be

no disclosure or suggestion in Kiluk (either expressly, inherently, equivalently or

otherwise) that separate calculations should be performed on each detected outlier

based only on data from days of the week having similar consumption profiles as

required by claim 3."

First, the Examiner contends that recognition of a particular problem is not a

requirement for a 103 rejection. In fact, although the claims are interpreted in light of

the specification, limitations from the specification are not read into the claims. See

In re Van Geuns, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

The Examiner asserts that the invention of Kiluk suggests comparing the

measurement values to reference values with groups defined by time period of

normally similar usage (column 3, lines 24-27), groups of days of normally similar

and groups dependent on changes in living habits, and using these changes to

modify the standard curve in order to provide accurate results though the

comparison of common usage profiles (column 3, lines 46-61). More specifically,

Kiluk discloses obtaining two weeks of usage data that are grouped and combined to

form a one-week standard curve, still indicative of usage with respect to the grouped

days. Current data is then laid over the standard curve to determine the occurrence

of the outliers. Since the current data is superposed in chronological order based upon the current time, the days of similar usage are still compared to each other (i.e. day 1 of the current data is compared to the combined day 1 standard curve, day 2 of the current data is compared to the combined day 2 standard curve, etc.) (Figures 2 and 3). The invention of Carey is then included to modify the invention of Kiluk to use a well-known method for calculating a standard deviation for determining the outliers. While Applicant asserts that there is only one curve for comparison (i.e. one standard curve encompassing an entire week), the Examiner maintains that the standard curve is still divided by day and, as previously noted, Kiluk specifically mentions comparing data with similar consumption profiles grouped together. Therefore, one having ordinary skill in the art would understand that implementing the GESD method of Carey into the invention of Kiluk would be done by performing the comparison one day at a time (i.e. compare the current data for day 1 with the standard curve comprising a combination of previous day 1's). In this way, performing the comparison one day at a time to determine the outliers would provide average energy consumption for days of the same type as the outlier.

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

JP Patent No. 08-304120 to Furuta teaches a centralized meter-reading device

comprising a processor for comparing a consumption amount per day to a reference

consumption per day.

U.S. Patent No. 4,701,698 to Karlsson et al. teaches a microprocessor based

energy consumption meter.

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and

any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing

date of the advisory action. In no event, however, will the statutory period for reply

expire later than SIX MONTHS from the mailing date of this final action.

8. Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Jeffrey R. West whose telephone number is

(703)308-1309. The examiner can normally be reached on Monday through Friday,

8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Marc S. Hoff can be reached on (703)308-1677. The fax phone

numbers for the organization where this application or proceeding is assigned are

(703)308-7382 for regular communications and (703)308-7382 for After Final

communications.

Any inquiry of a general nature or relating to the status of this application or

proceeding should be directed to the receptionist whose telephone number is

(703)308-0956.

jrw
September 17, 2003

MARC S. HOFF
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800